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ARE INTERNATIONAL MARKET DEMANDS COMPATIBLE WITH SERVING DOMESTIC SOCIAL NEEDS? CHALLENGES IN STRENGTHENING INNOVATION CAPACITY IN KENYA'S HORTICULTURE INDUSTRY

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Abstract

Agrifood stakeholders across the world are under ever-increasing pressure with globalization and new market demands — together with changing quality and safety requirements. The ability to respond to new challenges and opportunities is important not just for producers but also for industries in developing countries. This paper explores the horticulture sector of Kenya in order to gain a better understanding of what has most significantly contributed to its success in terms of innovation response capacity. This paper aims to present what "innovation response capacity" entails, especially for natural resource-based industries in a developing country context. It will also provide an analytical framework that draws elements from agricultural innovation capacity and the innovation systems framework. This is provided through case study research conducted in Kenya by exploring a prominent horticultural enterprise, Homegrown Ltd. The paper concludes that an important element of success in this case was the formation of a range of linkages that enabled a systemic sector response to challenges rather than isolated action of individual players.

Key Words: Innovation Response Capacity, Kenya, Horticulture, Globalization, Smallholder Production, Policy

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I. INTRODUCTION

For natural resources-based industries in developing countries responsiveness to rapidly-changing markets, trade rules and policy conditions is central to survival. This responsiveness entails being able to continually innovate — introducing new products, using new processes and addressing new consumer demands. This capacity — we term it *innovation response capacity* — is thus central to the economic success of companies and sectors. Yet, despite its obvious importance, the contours of this type of capacity are poorly understood and documented, particularly in relation to developing countries. This case study explores the horticulture sector of Kenya in order to gain a better understanding of what has most significantly contributed to its success in terms of innovation response capacity. The paper's empirical basis is drawn from a series of key informant interviews conducted with a wide variety of stakeholder groupings combined with reviews of secondary source materials. Details of these may be obtained from the Appendix and Bibliography.

An examination of the sector's past and present development demonstrates that Kenya's horticulture export industry not only achieved remarkable growth in terms of export volume and value, but also fostered the development of the sector's organisational structure. It provided it with a unique knowledge architecture that includes a number of sector-specific coordination bodies and incorporated a broad range of stakeholders. The study shows how the horticultural industry evolved from small beginnings into a major export success. Moreover, an important element of this success was the formation of a range of linkages that enabled a systemic sector response to challenges rather than isolated action of individual players. These aspects are well illustrated by one prominent horticultural enterprise, Homegrown Ltd., that used the input of skilled farmers for the horticultural export industry and helped to generate positive economic and social spin-offs. The export industry is still a key employer for large numbers of smallholders, and, increasingly, of unskilled and semi-skilled workers (the majority of whom are women) on large farms and in processing and packaging plants.

These positive outcomes, however, are not uncontested and the industry has struggled with public discontent over poor working conditions and environmental mismanagement. Moreover,

as much as the industry has gained a reputation for being a leading exporter of high quality produce to its export destinations, mostly EU markets, it has to continue to persistently enhance its capacity to stay competitive in difficult international markets and respond to rapidly-changing trade norms and standards. Associated with these challenges is an ongoing debate about the actual poverty-reducing potential of the horticulture export industry. Part of this story is the fact that while the horticultural sector has had quite good response capacity (i.e., it has survived numerous shocks in well-networked ways) this has often been at the expense of the smallholder component of the sector. In other words, current patterns of innovation capacity, while ensuring survival of the sector as a whole, may have questionable relevance to poverty reduction. This suggests that if public policy wishes to leverage poverty reduction impacts from such cases it needs to put in place incentives to skew existing patterns of innovation response capacity in favour of the poor. It needs also to rethink policies for technology development. Ways of doing this are discussed in the concluding section of the paper but a useful starting point is perhaps to consider the role of public policy in more nuanced ways than has arguably been the case in the past.

II. PUBLIC POLICY AND INNOVATION CAPACITY

In a recent publication on technology development Martin Bell (2007) has argued convincingly that at least for industry the main source of change is capability building in what he terms the *enterprise sector*. His argument explicitly downplays the role of formal R&D, particularly those bits that are carried out by public sector bodies such as research institutes and universities. Much of this latter category is designed more to create employment for scientists and seldom impinges directly on wealth creation. Conversely it is the design and engineering expenditures in private companies that really lay the foundations for technical change. He goes on to point out, however, that for many poor countries this is often at the expense of wider social developments since it is not often in the interests of private enterprise to commit resources to activities that can then be appropriated by its competitors.

It follows that ways should be found to link public and private resources such that technology development is allowed to help satisfy wider social welfare objectives. In his paper Bell goes on to specify how public policy could be used to satisfy these wider objectives, particularly with respect to overseas development assistance (ODA). For example, he suggests that donor schemes to support training and learning fellowships could be stretched beyond the current concentration on fellowships within university and similar contexts — moving beyond that to develop partnership arrangements with enterprises to provide fellowships for advanced learning and experience acquisition in engineering and related management areas. An approach of this kind is quite different from conventional public sector interventions. These tend to be regulatory in focus and in the East Africa case often boil down to the creation of a range of organisations that end up acting as bureaucratic obstacles to change and enterprise.

In the case of horticulture, however, this has largely been avoided simply because the sector has evolved largely as an independent entity. Where collective action has been needed the new enterprises have created *fit-for-purpose* institutions like the Kenya Flower Council (KFC 1996) or the Association for Fruit and Vegetables Exporters (FPEAK 1975) whose roles have been defined explicitly to improve the overall economic efficiency of private sector activity. Where the needs have been technological it has been realised early on that public sector institutes and

universities have not, in general, been useful sources. Productive and innovative capacities have thus been built directly by the enterprises themselves. The obverse of this, of course, has been that resultant social and environmental problems have been allowed to grow with little attention paid to necessary remedial measures. The normal contextual role of public policy is conspicuous by its relative absence.

III. HISTORICAL DEVELOPMENT

3.1 Early Growth

The roots of commercially-oriented horticulture production in Kenya date back to the early days of the 20th Century when private entrepreneurs began to venture into large-scale commercial production, exporting passion fruit juice, temperate horticultural crops and Asian vegetables[5] (Minot and Ngigi 2003). The first major drive, however, occured with the Second World War, which stimulated the development of horticulture production and processing and also marked the establishment of the first pineapple processing factories in the late 1940s (English et al. 2004). The early attempts to set up large-scale horticultural enterprises initially involved exclusively white settler farmers, but entrepreneurs at that time also began setting up smallholder production schemes and sourced much of their horticulture produce from indigenous Kenyan farmers[6], who were provided with planting materials, technical assistance and a guaranteed market (Minot and Ngigi 2003).

It is generally agreed that from its early days the prime impetus for expansion and commercialisation of horticulture came from the private sector. Unlike other export sectors, there was little direct interference in horticulture by the government, particularly not in markets or trade. However, the government never entirely ignored the sector's development. It established a number of regional research stations in support of horticulture experimentation as early as the first half of the 20th Century. By 1957 the National Horticultural Research Centre (NHRC) was established, which later evolved into Kenya Agricultural Research Institute's (KARI's) horticultural research centre, with its head office in Thika. It is also interesting to note that the government initially supported the set-up of horticultural research centres in a rather decentralised fashion, oriented toward the applicability of research outcomes and in proximity to producers and their knowledge/technology demands. Unfortunately, this later evolved into a

[5] Asian vegetables include eggplant, chilli, dudhi, karela (bitter gourd), okra, and other vegetables used widely in South Asian cooking. Indians working on the railway in East Africa started producing and trading them.

[6] Under colonial rule, African farmers were largely excluded from cash crop production. The early smallholder involvement in commercial horticulture is thus remarkable, as it preceded the Swynnerton Plan and became the model later adopted in various cash crop programs, most notably by the Kenya Tea Development Authority (Jaffee 1995).

larger and more centralised structure, which encouraged scientists to undertake their research in isolation and increasingly disconnected from clients — an issue that persists even today.

Independence brought land reform with redistribution to tens of thousands of smallholders[7]. The reform specifically embraced social considerations to support smallholders through public investments, including free primary education and the establishment of extension services and a regulatory environment. A second government body, the *Horticultural Crops Development Authority (HCDA)* was established in 1967 with a mandate to develop, co-ordinate and facilitate the horticultural industry. This reflected government recognition of the potential of export horticulture for Kenya's economy. However, unlike marketing boards for other commodities, the HCDA was never strongly involved in the setting of prices and never functioned as a legal monopoly in marketing. Rather, it confined itself to a facilitative role, attempting merely to coordinate the various actors in the sector. Many analysts regard the restricted intervention of the HCDA and the therefore relatively-uninhibited private sector drive as a determining factor for the rapid growth of the horticulture industries in Kenya.

Until the 1960s, however, horticulture experienced limited growth and at independence in 1963, exports still represented less than three percent of agricultural exports. In the first 10 years after independence, horticulture exports grew by a growth rate of 4.4 percent annually but nevertheless remained at less than three percent of agricultural exports because other export sub-sectors grew at similar rates (Minot and Ngigi 2003). Horticulture exports gathered momentum in the 1970s and a rapid take-off followed. Despite periodic challenges this has been sustained until the present.

In the 1970s export growth was mainly due to investments in pineapple processing led by Del Monte. In addition fresh and canned French beans became key export commodities in the late '70s and '80s. In fact, French beans, Asian vegetables and floriculture subsequently became the most important of Kenya's horticultural export commodities. According to Minot and Ngigi (2003) the industry at that point was able to capitalise on a few vital changes in the sector.

[7] This happened particularly in the Western Highlands, where land was distributed to smallholders after being purchased from European settlers. These were in a relatively good location and had fertile soils.

Following the decline in coffee and tea prices after 1977, producers had to identify alternate export commodities. The demand for export vegetables grew markedly in the 1970s, indirectly caused by the expulsion of the Asian community from Uganda.

For the large Asian community in the UK, Kenya constituted a convenient alternative supplier (to Uganda) for Asian vegetables. Kenya ensured year-round supply, smallholders had already accumulated experience with producing Asian vegetables and with the presence of the Asian community in Kenya, family and social ties between traders in London and Nairobi existed, reducing risk and transaction costs in the vegetable trade. The growth in tourism created air-freight space, which was convenient when export produce was too small in quantity to be carried by charter flights. Likewise, tourism provided alternate outlets for vegetables and other horticulture produce in the form of hotels and restaurants. These factors allowed the industry to accumulate experience in overseas marketing, transport and distribution at a time of growing international demand and also facilitated the consolidation of linkages to international markets, both vital for the subsequent rapid off-take in horticulture exports.

3.2 Take-off and maturity

Starting from the mid 1970s, Kenya's horticultural exports witnessed a rapid expansion. Growth rates doubled and by 1990 the horticultural sector had reached a plateau of 14% of agricultural exports. From that point export of flowers continued to grow while exports of fruit and vegetables have become more diversified. While the original export commodities such as French beans, Asian vegetables, canned pineapple and avocado still dominate exports, 30 different types of fruits and 27 types of vegetables are exported additionally. There is increased competition from other African countries, but Kenya has continued to be the most important supplier of vegetables to the European Union (Dolan and Humphrey 2000). While the country's main horticultural export crops are leguminous and "Asian" vegetables (Jaffee 1992) in recent years, cut flower trade has surpassed the latter in significance, presently representing about 60 percent of all horticultural export value (Bolo 2005). Although smaller in terms of market share, produce such as pineapple, avocado and passion-fruit are also key export commodities (EPZA 2005). On the whole, Kenya now supplies some 75 horticultural crops to its overseas markets, not only as

raw materials but increasingly as pre-packaged and pre-prepared vegetables (Humphrey at al. 2004).

The horticulture trade has always been fairly competitive, but Kenyan exporters have demonstrated considerable resilience in the face of the recurring challenges posed by international markets. Jaffee (1995) describes the turbulent history of attempts to expand exports of dehydrated vegetables, passion fruit juice, and pineapple products, including several bankruptcies and government buy-outs. Kenya lost the European fresh pineapple market to Côte d'Ivoire in the 1980s. It was squeezed out of avocado exports to Europe by higher quality of Israeli and South African products, and it lost the European market for courgettes, sweet peppers, and other temperate vegetables to European Mediterranean suppliers. Yet, it has shown resilience in finding new markets and expanding its exports, especially of French beans, Asian vegetables, and cut flowers. (Minot and Ngigi 2003)

Representatives of the sector suggest that the horticulture industry has recently undergone change processes equivalent to a metamorphosis, suggesting that the dynamic responses required to comply with EU trade regulations, such as the MRL[8] in 2002, the upcoming EU Food Safety measures and the Traceability of Produce measures' are increasingly being addressed by the sector as a whole. This is the outcome of two intertwined processes. There is a growing recognition among individual companies and other stakeholders that the industry can and should be regarded as one single entity[9.] However, in order to survive in the international market it also needs to embark on creating unified response mechanisms. To this end new organisations and strategic linkages among organisations have been established that increasingly facilitate information flow, sector coordination and systemic action in response to challenges. The most recent example of this is the creation of the Kenya Task Force for Horticulture (KTFH). The Task Force mainly provides a forum for discussion of pressing issues facing the horticulture export industry among all (private and public) stakeholder groupings (interview data).

[8] MRL: Minimum Residue Levels

[9] In the interviews this was noted when individual stakeholders would identify themselves with the sector by using the term "we" to talk about the whole industry.

IV. SOCIAL SIGNIFICANCE OF HORTICULTURE IN KENYA

Horticultural production and trade in Kenya has evolved into one of the country's most vital sectors, contributing to domestic food needs, economic growth, income generation, employment opportunities and foreign exchange earnings. The sector as a whole — including horticultural production for domestic and international markets — is now estimated to generate employment for about two million people. The overall value of horticultural exports was estimated to exceed $350 million in 2003 with a persistent upward trend, representing about 35 percent of all Kenyan agricultural exports[10] (English et al. 2004). In recent years, horticultural exports have surpassed coffee to become Kenya's third most important foreign exchange earner after tea and tourism.

The success of Kenya's horticultural industry is perceived to have had a major impact in contributing to poverty reduction. The most immediate impact on the poor is through employment generation, particularly the creation of jobs for unskilled and semi-skilled workers in rural as well as urban areas (McCulloch and Ota 2002). English et al. (2004) estimate that the export industry alone provides full time yearly income for about 135,000 people, directly supporting about half a million workers, small farmers and their families. As illustrated in Table 1, the horticulture export industry in Kenya creates employment for specific segments of the workforce that can largely be divided into rural smallholders, producing fruits and vegetables, rural labourers on larger farms and in pack-houses, urban factory workers in processing of fruits and vegetables, and rural and urban labourers in the cut flower industry.

Table 1: Employment in the horticulture export industry (2003)

Category	People employed
Smallholders (fruits and vegetables)	35000-40000
Processing industry workers (fruits and vegetables)	5000-10000
Pack-house and farm labourers (fruits and vegetables)	40000-50000
Cut flower industry	40000-50000

[10] Export horticulture accounts for about four percent of total horticulture production in Kenya. However it plays a vital role for domestic horticultural production and trade and has created important spillover effects. It has, for example, contributed markedly to the overall upgrading of farming skills in the agricultural sector (interview data).

Total	120000-150000

Source: English et al. 2004

The pattern of employment creation within the different segments reflects Kenya's specific structure of production. Since its early expansion phase in the 1980s, the sector has incorporated considerable numbers of smallholder horticulture farmers[11] in the export of vegetables, fruits and, to a small extent, cut flower exports (Jaffe 1992). In the 1990s, the role of large-scale horticultural export companies with often vertically-integrated production and processing facilities increased (Jaffee 2003). However, seasonal shifts in export demand still provide ample business opportunities for smaller processors and/or exporters who obtain produce from small and medium-size farms in rural spot markets (Minot and Ngigi 2003). Likewise, smallholders account for a dominant share of export fruits, particularly mango and avocado (Jaffee 2003). The floriculture sub-sector has numerous registered growers, but about three-quarters of all exports are produced by just two-dozen large-scale export operations (Bolo 2005). In many segments of the industry women constitute the larger share of workers, dominating in particular the workforce employed in pack-houses, in vegetable production and on cut flower farms and in cut flower processing (English et al. 2004). Particularly in the cut flower industry, which is extremely labour-intensive and employs predominantly youthful female workers, women make up about three-quarters of all labour employed in production and processing (Dolan et al. 2003).

A number of recent studies seek to provide more comprehensive and detailed household level information and explore probable growth scenarios for the sector, asking whether participation in the horticulture sector benefits the poor (English et al. 2004; Humphrey at al. 2004; McCulloch and Ota 2002). These studies demonstrate that the growth of the industry generates jobs mainly for skilled and semiskilled workers in urban and rural settings where income-earning alternatives are typically very limited. While payment is low, and pack-house workers often work extremely long hours during peak seasons, wages are still mostly above government-mandated minimum agricultural wages. Overall, comparisons with similar but non-horticultural wage labour "provides strong support for the conclusion that urban employees draw substantial benefits from

[11] There is no standard definition for the term smallholder with regard to horticultural production in Kenya, but typically this refers to farm size, with a smallholder typically producing horticultural crops on less than one hectare of farmland.

involvement in the horticulture sector and that rural labourers are also better off" (English et al. 2004). The studies point out that labourers hired to work on horticultural farms are drawn from the poorest dwellers in rural areas who own little or no land, emphasising that their employment in the industry has a direct impact on poverty reduction.

In a country where half of the population lives below the absolute poverty line an industry with such employment-generating potential plays a vital role in poverty alleviation, especially when considering that the majority of the employed labour force comprises women. However, a number of studies have raised concerns about the actual benefits that export horticulture provides to employees and the wider economy (Dolan et al. 2003). These concerns are related primarily to the frequently-documented low labour standards prevailing on large farms and in processing plants. In particular, women, who are mostly employed as seasonal and casual labour, face severe gender discrimination, experiencing sexual harassment and an insecure and exploitative overall work environment. In addition, there are accusations of severe depletion and damage to the country's natural resources that must eventually impact on the larger economy (Dolan et al. 2003).

While women make up the majority of labour in the sector and are thus a key human resource, few mechanisms, if any, exist which would engender a trade policy process in Kenya that is gender-sensitive. At the same time major structural changes, taking place due to the pressures of international markets and demanding compliance with trade norms and regulation, are predicted to affect smallholder participation in the horticulture export sector specifically (English et al. 2004). This trend, which potentially limits the sector's potential to continue providing income-earning opportunities for smallholder producers in rural areas, is the subject of another controversy among different stakeholders.

In the past, particularly during the growth of the horticultural sector in the 1980s, growth provided jobs for many thousands of smallholders. Jaffee (1995) estimates that between 14-15,000 smallholders were involved in the production of fresh produce for export in the mid-1980s, contributing to a combined export volume of fruits and vegetables of about 50 percent (45 percent of supplies of French beans, Asian vegetables, and other vegetables and a slightly larger

share of fresh fruit, particularly mangoes and avocado). Estimates for 2001/2002, however, suggest that smallholder participation in vegetables had fallen to 27 percent, although smallholders have continued to maintain a dominant share in the production of export fruits, accounting for about 85 percent of exports (Jaffee 2003). This combines to an estimated volume share of 47 percent produced by smallholders at present. Overall, however, the employment-creating capacity of the sector as a whole has decreased and there is some evidence to suggest that greater export market regulation will continue this trend.

V. HOMEGROWN: TAKING THE EXPORT CHALLENGE TO NEW HEIGHTS

It is interesting to relate these broad sectoral developments to a specific case. HomeGrown Ltd. came into business in 1982 — a time when horticulture exports in Kenya started to grow dramatically. Three business partners, none of them experienced in horticulture, decided to get involved in the export of fresh vegetables, initially instigated by the difficulties one of them experienced in exporting at Christmas time to Europe. Many of the initial challenges the business faced revolved around the logistics involved in the export of fresh horticulture produce to Europe. The company started with 15 employees in 1985 and initially grew vegetables on leased land but purchased its own farmland in 1986, notably the Flamingo Farm at Lake Naivasha. Different from other horticultural enterprises in Kenya the Homegrown strategy was to own its land, which it fully realised by 1996. In 1990 the company constructed Kenya's first metal green house structures at Lake Naivasha to grow roses (Wambalaba and K'Aol 2006).

In the 23 years of its existence, Homegrown has evolved into a multinational enterprise, now run under Flamingo Holdings. It has invested over $100 million in its Kenyan operations over the past 20 years and presently employs some 8,000 people in Kenya. The company acquired more than 2700ha land at three major production sites, ensuring a geographically diverse land bank[12] and erected its own physical infrastructures, including the JK Airport Depot, vegetable processing plants and vehicle workshops with farm machinery, irrigation and road construction equipment. The firm also developed its own internal farmer training and extension services and accesses most of its research needs and technology either from Europe or through Dudutech, a sister company established in Kenya to develop locally-appropriate integrated pest management (IPM) solutions. Its horticulture export is an entirely vertically-integrated business connecting production and processing in Kenya via airfreight, marketing, distribution and supply to its outlets in Europe, mainly supermarkets in the UK.

[8] Only 20 percent of the land is cropped at any one time. This highlights the indirect cost occurring to establish the required logistics in satisfying EU markets.

Much of the company's achievements can be accounted for by the anticipation of challenges, an attitude apparent in Homegrown's management[13]. Typically the horticulture export sector faces a high frequency of modest, though diverse and ever new challenges. Likewise, by its nature, horticultural export to the EU is about delivering high-quality fresh produce, but the product's perishability makes exporting a very volatile business. A few hours of delay in transport can render an entire shipment lost. Importantly, the latter factor has shaped the attitude and work habits that determine the company's ability to embrace and manage change. It becomes apparent how this attitude and work habit constitutes a basic component of the company's innovation response capacity, as it determines its ability to handle challenges in a problem-solving manner. According to senior management the challenges Homegrown has had to face have changed significantly over the years but these have always been numerous. In addition, it is always necessary to anticipate upcoming challenges, such as harmful organisms (anticipated as the "next generation" of technical trade issues), new non-technical trade barriers (as part of further tightening trade regulations), further increases in air freight costs, and potential consumer discontent associated with "carbon footprint" issues.

In its early days, one of the main challenges Homegrown had to overcome was a range of difficulties surrounding the organisation of sufficient and timely airfreight space (when at times communication was hampered due to stolen copper telephone wires). More recent challenges for the company have been the negative media attention over the industry's environmentally-unsound production practices and the demanding labour conditions on farms and in processing plants. Subsequently the requirements to comply with MRL and other standards and trade norms and the increasing competition from an ever-increasing number of new horticulture-exporting countries entering the international market have emerged. Kenya is about to lose its preferential treatment under the economic partnership with the EU while in 2007 oil prices continued to rise, leading to increased fuel and air freight costs. There is also the lack of infrastructure, foremost the bad state of roads, and multiple levies experienced by the export companies.

[9] An observational outcome of the personal communication with HG senior management, who described why change and challenges are nothing out of the ordinary but rather the nature of the business and thus part and parcel of HG management.

Despite such difficulties, however, Homegrown at present supplies fresh and semi-processed vegetables to supermarkets in the UK and other locations in the EU in less than 72 hours. To make this possible, the company has invested in putting the required infrastructure and operations in place that enable it to harvest, process, package, ship and sell in a very short period of time. Unlike other firms that adopted a strategy of escape from the at-risk profit margins in Kenya to seemingly cheaper production locations like Uganda, Tanzania or recently Ethiopia as well, the strategy that Homegrown adopted was that of value addition in the face of international competition coupled with a staunch refusal to leave the country but rather own the land the company produces on[14]. Furthermore, Homegrown has invested in getting better integrated into European markets. It strengthened its company's presence abroad and continued its improvement in quality standards and compliance with European consumer preferences through setting even higher goals in value addition. Homegrown registered a number of sister companies in the EU between 1994 and 2004, including Homegrown itself under the umbrella of Flamingo Holdings in 2004 in the UK.

Another attitude or work habit emerges from an examination of the company's management strategy where it operates with a strong "do it yourself"[15] mentality and adopts a strategy of internalising additional operations along the value chain into a highly vertically-integrated business. Outsourcing service provision and input requisition clearly never became part of the company's strategy, partly because available capacities at national level appear too weak for the company's requirements. These include factors such as farmer extension services, research and technology acquisition or sector regulation to comply with market standards in the EU.

There have been many attempts to collaborate with the public sector, particularly in forging partnerships for developing technical solutions to comply with international standards and regulation. However, while some have been successful there remains discontent, especially over lack of efficiency and flexibility in public sector research. Being confronted with these difficulties, "doing it ourselves" basically means two things — first, finding new partners and establishing linkages with other sources for the requires know-how and services, typically found

[10] Homegrown, however, has also invested in additional production sites, including South Africa, along the Equator, Columbia and Thailand, to ensure steady supply to the EU.
[11] "We do everything ourselves" is the phrase frequently cited in interviews with Homegrown management.

“in the North” and second, establishing internal capacities to better source and utilise these, such as for example Dudutech or the company’s own training department, which not only covers health/safety issues but also child care and HIV education.

Realisation that there is no suitable provider of locally-relevant IPM solutions in Kenya and to facilitate collaboration with international expertise led to the formation of Dudutech in 2000. This company, however, does not carry out basic research, but rather sources it externally and then develops the technology and procedures required to turn available scientific knowledge into commercial products. Dudutech at present also exports its products to South Africa. Conversely acquiring and utilising basic research from local sources such as KARI has so far been unsuccessful with both sides now reluctant to go into continued partnership. These problems are partly related to difficulties in fulfilling agreements. There are also intellectual property rights (IPR) issues.

VI. DISCUSSION

The Homegrown story indicates that, like the horticulture sector as a whole, development has been very different from Kenya's other export commodities, such as tea and coffee. In the early days the government acted in an almost *laissez-faire* style, thus allowing private entrepreneurs the space to get engaged in an experimental way of operating its businesses. Companies were able to take advantage of opportunities that opened up the international market and were assisted by national synergistic connections to the tourist industry. Even though growth in these early years was comparatively slow there is evidence that the sector was vibrant in terms of trying out different horticultural crops, different institutional settings, out-grower arrangements, different forms of accessing land, etc. Subsequent creation of a range of public bodies has not changed this context, with the private sector continuing to deal on its own with emergent challenges. In short, the history of horticulture may be summarised as follows:

1. The sector has survived, flourished, evolved and reinvented itself numerous times over the last 30 years or so. This has been in the face of stiff competition from other producer countries and against a backdrop of ever-tightening trade rules. While survival is a crude indicator of innovation capacity, it is, nevertheless, tangible evidence of an ability to change and prosper under changing conditions. The caveat being that sector survival is only a measure of the economic robustness of underlying capacities and not the social and environmental relevance of these capacities.
2. Historically the sector's emergence and capacity has been the result of its agro-ecological comparative advantage and the entrepreneurial flair of its business community. Again, for historical reasons these are white and Asian communities that provide links to and knowledge of distant markets.
3. The role of public policy has been conspicuous by its absence. Kenya did develop agricultural science capacity, but this either did not deal with relevant research topics, or there were institutional reasons that prevented productive relations forming between research and enterprise organisations.
4. Historically the smallholder production base suited the needs of the industry and its market and Kenya had experience and capacity for production in this mode.

5. As the technological sophistication of the sector developed and new technical challenges emerged, technical support arrangements had to be identified. Typically, while public agriculture science organisations existed, their focus and modus operandi were not suited to the needs of the sector. The sector's strategy therefore involved accessing technology and expert service on the international market, or even establishing technology supply companies such as Dudutech.
6. While horticultural companies did not establish their own research facilities, they did gradually increase their in-house technical skills. This helped them be more intelligent consumers of technical services from elsewhere. It was also necessary to enable technical oversight of operations and to undertake the numerous modifications/ fine-tuning of production processes.
7. The delineation and recognition of itself as a coherent sectoral entity has been critical. Historical and community-based networks have probably aided this in Kenya. Indeed, even within large companies such as Homegrown a high degree of social capital has been important in implementing change and innovation. This allowed the sector to address issues of, for example, quality, compliance and branding at a sector-wide level. Also critical here was the use of "fit-for-purpose" groups to address problems and coordinate collective action.
8. Globalisation has been a major driving force for both the evolution of the sector and the changing nature of its innovation capacity.
9. Sector development in response to globalisation, and particularly consequent international compliance with trade standards, has been a double-edged sword in terms of its social consequences, improving conditions for labour, but at the same time tending to shift the sector towards large-scale production at the cost of smallholders. This may be a transitional social cost but could also be problematic without alternatives public or private sector generated employment opportunities in rural areas.
10. Innovation for international trade compliance has forced the sector to extend its knowledge networks in the international arena in its search for solutions.

What, then, can we conclude about innovation response capacity? The first and most obvious point is that innovation capacity is something that co-evolves with the development of a specific

sector in a specific location. Historical origins and starting conditions play a large role in shaping subsequent evolution, and there is thus a high degree of path-dependent development. Secondly, the role of formal R&D has been far less important than one might expect. This is partly because R&D support from the public sector was simply absent. But, more accurately, the type of technical support that was required could more conveniently be accessed internationally. In addition many of the necessary innovations involved the introduction of production and marketing arrangements that complied with international standards. There was a technical content to this, but more important was putting in place appropriate process management, control and documentation systems.

Thirdly, formal and informal networking and coordination mechanisms were critical to the sector's ablity to cope with change. Although the case study does not provide direct evidence of the role of underlying patterns of social capital, this has clearly played a role in allowing the emergence of,, for example, fit-for-purpose groupings. The self-recognition of horticulture as a separate delineated sector is key indicator of this. Finally, unregulated private sector-led development of innovation capacity as a means of coping with globalisation will led to a restructuring of the underlying production systems, bringing with it a short-term social cost. The Kenya horticulture story is clearly a story of moving from smallholder to large-scale production. There are ideological debates about whether in the long run this sort of transition is desirable or not. It does, however, raise urgent public policy questions about how these processes should be managed. This is particularly urgent in a rural context where few alternative employment opportunities exist.

VII. CONCLUSIONS FOR PUBLIC POLICY

So what are the lessons for public policy? In other cases (Laxmi Pant et al, 2008 also World Bank 2006)) we have advocated that public policy, in order to develop innovation capacity, should assist with building linkages and intra-sectorial coordination. Indeed, the above-mentioned thoughts of Martin Bell (2007) on using development assistance to support training as a route connecting research organisations to the productive sector is along these lines. But this case seems to be different. For sure, links with Kenyan research organisations are weak, and for sure the public sector has played next to no role in sector co-ordination. However, it also seems clear that this may have been a blessing in disguise, as it has allowed the private sector to get on and organise itself, source technology and expertise for responsive innovation and put in place its own sector co-ordination mechanisms that confer the systemic coherence so critical to innovation processes.

The role of public policy is surely, therefore, to support this pattern of development and find ways of addressing some of its negative consequences. In the short term this might mean providing, for example, tax incentives to maintain smallholder outgrower arrangements, although these could be difficult to organise transparently in the insitutional setting of Kenya. In the longer term public policy might wish to encourage the development of a wider agro-process-based industry that could create opportunities for further rural employment and which could utilise skills and capacities developed in horticulture. Precisely who could do this would need some thought. Public enterprise is clearly not the way to go in Kenya, and joint public/private initiatives may also be problematic. The use of development bank fund to finance to the private sector might be one route. This has been tried relatively successfully with pineapple processing in Ghana (World bank 2006).

In the long run Kenya, like many similarly placed countries, will need to rethink how the public sector provides research and other technical support to underpin this sort of innovation capacity. Linking industry to public laboratories is not the answer by itself. The process is too cumbersome and the research focus needs considerable reorientation and upgrading before it can become relevant. Instead of trying to bring about the needed insitutional change in current

arrangements, it might be better for the public sector to focus on funding training and subsidise the private sector to develop its own R&D capacity. One is left with the conclusion that in countries like Kenya, public policy is constrained in how it can usefully contribute to innovation capacity because the machinery of government is part of the problem. A regulatory role to skew private sector development in the direction of social goals is probably desirable, but fraught with problems. The only real hope is that political changes in the country can strengthen the transparency of public adminstration and usher in a new era of effective public policy.

To sum up, the essential components of innovation response capacity in Kenyan horticulture have largely been developed and operated by the enterprise sector itself. At the same time relevant public bodies have been largely disconnected from economic production, effectively having no social role to speak of. The overall issue therefore becomes one of how to maintain and extend the capacity of the sector to provide employment and income for disadvantaged communities whilst at the same time preserving economic viability in an increasingly globalised world. Some steps are now being taken in this direction through the creation of the Kenya Task Force on Horticulture (KTFH 2004) and the private sector-led Kenya Flower Council (KFC) but there is clearly a need for the government to take a more informed approach to the issue. The horticulture sector appears to be yet one more example of private sector-led development that has been successful in an economic sense since public sector institutions have not been allowed to interfere. The question is, however, how sustainable is this success?

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